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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/630,941

07/31/2003

Fu-Jen Ko

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12/15/2004

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EXAMINER

SCHECHTER, ANDREW M

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/630,941

Applicant(s)

KO ET AL.

Examiner

Andrew Schechter

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2003.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-20 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 31 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/20/03.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 6 is objected to because of the following informalities: claim 6 should depend on claim 5, which first recites the "long axis". Appropriate correction is required.
2. Claims 1-20 are objected to because of the following informalities: the word "type" in "reflection type liquid crystal display device" is unnecessary and tends to make the claim language indefinite [see MPEP 2173.05(b)]. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 1-6, 8-13 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "hemi-ellipsoid bumps". Does this include hemispherical bumps? A sphere is a limiting case of an ellipse, where the long and short axes are equal in length. Claim 7 recites the short axis being shorter than the long axis, which seems to be a tautology, and not further limiting, if a hemisphere is excluded. Nonetheless, in light of the specification, it is assumed for examining purposes that hemispherical bumps are meant to be excluded from the scope of the term "hemi-ellipsoid bumps".

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 2, 4, 5, 9, 11, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by *Mitsui et al.*, U.S. Patent No. 5,204,765.

Mitsui discloses a reflection LCD comprising a first insulation substrate [21] that is transparent and has a transparent electrode [23] on an inner surface thereof; a second insulation substrate [11] having a reflection electrode [16] on an inner surface thereof, wherein a surface of the reflection electrode has hemi-ellipsoid bumps [see Fig. 4d, for instance]; a liquid crystal layer [25] between them; and a device [22] for generating an electrical field between the transparent electrode and the reflection electrode. Claim 1 is therefore anticipated.

The first insulation substrate is glass [col. 5, line 41], so claim 2 is also anticipated. The reflection electrode is aluminum [col. 3, line 59], so claim 4 is also anticipated. The bump has a long axis, short axis, and a height, so claim 5 is also anticipated. A cross section of the bump is an ellipse, so claim 9 is also anticipated.

The device for generating an electrical field is a thin film transistor [col. 5, line 40], so claims 11 and 20 are also anticipated.

7. Claims 1-7, 9, and 11-13 are rejected under 35 U.S.C. 102(b) as being anticipated by *Nakamura et al.*, U.S. Patent No. 5,973,843.

Nakamura discloses a reflection LCD comprising a first insulation substrate [201] that is transparent and has a transparent electrode [203] on an inner surface thereof; a second insulation substrate [101] having a reflection electrode [105] on an inner surface thereof, wherein a surface of the reflection electrode has hemi-ellipsoid bumps [see Figs. 3c, 3d, and 8b, for instance]; a liquid crystal layer [210] between them; and a device [104] for generating an electrical field between the transparent electrode and the reflection electrode. Claim 1 is therefore anticipated.

The first insulation substrate is glass and the transparent electrode is ITO [col. 9, lines 25-28], so claims 2 and 3 are also anticipated. The reflection electrode is aluminum [col. 9, line 15], so claim 4 is also anticipated. The bump has a long axis, short axis, and height, so claim 5 is also anticipated. The long axis is 5~20 μm [col. 9, lines 55-67], so claim 6 is also anticipated. The short axis is shorter than the long axis, so claim 7 is also anticipated. A cross section of the bump is an ellipse, so claim 9 is also anticipated. The device for generating the electrical field is a TFT, so claim 11 is also anticipated. The TFT is formed on the second insulation substrate and a drain electrode [109] of the TFT electrically connects to the reflection electrode, so claim 12 is also anticipated. There is an organic insulation layer [111] formed between the TFT and the reflection electrode, so claim 13 is also anticipated.

8. Claims 1, 2, 4, 5, and 9-13 are rejected under 35 U.S.C. 102(b) as being anticipated by *Tsuda et al.*, U.S. Patent No. 6,097,458.

Tsuda discloses a reflection LCD comprising a first insulation substrate [141] that is transparent and has a transparent electrode [143] on an inner surface thereof; a second insulation substrate [151] having a reflection electrode [147] on an inner surface thereof, wherein a surface of the reflection electrode has hemi-ellipsoid bumps [see Figs. 23, 24, 27a, 29a, and 73b, for instance]; a liquid crystal layer [145] between them; and a device [150] for generating an electrical field between the transparent electrode and the reflection electrode. Claim 1 is therefore anticipated.

The first insulation substrate is glass [abstract], so claim 2 is also anticipated. The reflection electrode is aluminum, so claim 4 is also anticipated. The bump has a long axis, short axis, and height, so claim 5 is also anticipated. A cross section of the bump is an ellipse, so claim 9 is also anticipated. The bump is an inclined bump [see Figs. 23, 24e, etc.], and the cross section is an ellipse, so claim 10 is also anticipated. The device for generating the electrical field is a TFT, so claim 11 is also anticipated. The TFT is formed on the second insulation substrate and a drain electrode [150a] of the TFT electrically connects to the reflection electrode, so claim 12 is also anticipated. There is an organic insulation layer [148] formed between the TFT and the reflection electrode, so claim 13 is also anticipated.

9. Claims 1, 3-5, and 9-13 are rejected under 35 U.S.C. 102(e) as being anticipated by *Yamanaka et al.*, U.S. Patent No. 6,452,653.

Yamanaka discloses a reflection LCD comprising a first insulation substrate [20] that is transparent and has a transparent electrode [23] on an inner surface thereof; a second insulation substrate [11] having a reflection electrode [15] on an inner surface thereof, wherein a surface of the reflection electrode has hemi-ellipsoid bumps [see Figs. 1-3, etc.]; a liquid crystal layer [21] between them; and a device [51] for generating an electrical field between the transparent electrode and the reflection electrode. Claim 1 is therefore anticipated.

The transparent electrode is ITO, so claim 3 is also anticipated. The reflection electrodes is aluminum, so claim 4 is also anticipated. The bump has long axis, short axis, and height, so claim 5 is also anticipated. A cross section of the bump is an ellipse, so claim 9 is also anticipated. The bump is an inclined bump [see Fig. 3, for instance], and the cross section is an ellipse, so claim 10 is also anticipated. The device for generating the electrical field is a TFT, so claim 11 is also anticipated. The TFT is formed on the second insulation substrate and a drain electrode [51a] of the TFT electrically connects to the reflection electrode, so claim 12 is also anticipated. There is an organic insulation layer [13] formed between the TFT and the reflection electrode, so claim 13 is also anticipated.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 2871

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 6-8, 14, and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Yamanaka et al.*, U.S. Patent No. 6,452,653, as applied to claims 1, 3-5, and 9-13 above, in view of *Yamanaka et al.*, U.S. Patent No. 6,452,653.

Considering the additional limitations of claims 6-8 and 14, *Yamanaka* does not necessarily explicitly disclose the long axis being 5~20 μm or the height being 0.5~2 μm ; it does disclose the short axis being shorter than the long axis.

Yamanaka does teach that the height should be 1~5 μm [see col. 19, lines 30-43, and Fig. 9a and discussion thereof]. This overlaps the recited range; in such cases a *prima facie* case for obviousness exists [see MPEP 2144.05]. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a height in the recited range, motivated by *Yamanaka*'s teaching that the height should be 1~5 μm (not larger to avoid unevenness of the cell gap and display non-uniformity). *Yamanaka* also teaches that the bumps should have widths in the range between 1-100 μm [col. 5, lines 63-65, etc.]. This overlaps the recited range for the long axis; in such cases a *prima facie* case for obviousness exists [see MPEP 2144.05]. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a long axis in the recited range, motivated by *Yamanaka*'s teaching that the long axis should be 1~100 μm , to be appropriate to the typical pixel size in such LCDs, and to provide the desired display and reflection properties. Claims 6-8 and 14 are therefore unpatentable.

Claims 16-19 are analogous to claims 3, 4, 9, and 10 with limitations that are disclosed by *Yamanaka* as discussed above. Claims 16-19 are therefore unpatentable.

Art Unit: 2871

12. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Yamanaka et al.*, U.S. Patent No. 6,452,653 in view of *Yamanaka et al.*, U.S. Patent No. 6,452,653, as applied to claim 14 above, and further in view of *Mitsui et al.*, U.S. Patent No. 5,204,765, *Nakamura et al.*, U.S. Patent No. 5,973,843, and *Tsuda et al.*, U.S. Patent No. 6,097,458.

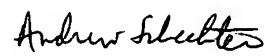
Yamanaka does not explicitly disclose making the first insulation substrate out of glass. *Mitsui*, *Nakamura*, and *Tsuda* make the analogous substrate out of the glass as discussed above. It would have been obvious to one of ordinary skill in the art at the time of the invention to make *Yamanaka*'s substrate of glass, motivated by it being transparent, insulating, relatively easy to handle, and conventional as evidenced by these other references. Claim 15 is therefore unpatentable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Andrew Schechter
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6 December 2004